

AP/ECE Statistics Summer Packet

2021 – 2022

Ansonia High School

You are not required to print this packet

The summer packet is due on the 1st day of school

****Use the Google Form linked below to submit your multiple choice answers****

[AP/ECE Summer Packet 2021-2022 Google Form Link](#)

Original URL: <https://forms.gle/P57WHLdymjWJcvi6>

One of the main goals of statistics is to propose data-driven decisions related to a variety of hypothetical and real-world cases. This introductory course covers four main topics – exploring data, sampling and experimentation, probability and simulation, and inferential statistics. Throughout the year, you will be tasked with analyzing and interpreting these topics in both written and verbal forms.

Communication skills are essential, and there is much more reading and writing than what you might be used to in a math class. The mathematics required for this course may not be as difficult as in other advanced math courses, but some of the concepts can be confusing. In addition, there is a great deal of material that we are expected to cover by the end of April, so you need to be committed to giving it your absolute best effort day in and day out.

This packet will be due on the first day of school and will count as a major grade. You should give yourself at least a week to complete it. If you find something confusing, please email me (skerton@ansonians.org). During the summer, I may not be checking my email every day, however, I will get back to you as fast as I can. I expect you to give this packet your best shot, but you will not be penalized if you get an answer “wrong”. We will go over the critical components of this packet in class. As with any assignment, copying answers from another individual or another source is considered academically dishonest and will result in a grade of a zero.

Enjoy your summer and I look forward to seeing you all in August!

– Mr. Kerton

Directions: Respond to the following problems. You may print this packet and circle your final answers. Otherwise, please record all of your final answers on a separate piece of paper. Show all work where necessary to receive full credit.

Section A: Percent, Decimals, and Proportion

1. Three percent is equivalent to what decimal:
 - a. 300
 - b. 30
 - c. 3
 - d. 0.3
 - e. 0.03
 - f. 0.003
2. The decimal 0.5 is equivalent to what percentage:
 - a. 5%
 - b. 50%
 - c. 500%
 - d. 0.5%
 - e. 0.005%
 - f. 0.005%
3. "16%" is equivalent to which of the following:
 - a. 16
 - b. 0.16%
 - c. 0.016%
 - d. 0.16
 - e. 0.016
 - f. 0.0016
4. Is the following a true statement? "Since $\frac{1}{10}$ is 10%, it must be true that $\frac{1}{4}$ is 4%.
 - a. No, this is not a true statement. Although $\frac{1}{10}$ is 10%, this only works with the number 10.
 - b. Yes, this is a true statement because this pattern will work with any number.
5. Complete the sentence: 0.04 is _____ 0.01.
 - a. Less than
 - b. Equal to
 - c. Greater than
6. Complete the sentence: 0.008 is _____ 0.05.
 - a. Less than
 - b. Equal to
 - c. Greater than
7. Complete the sentence: 0 is _____ 0.01
 - a. Less than
 - b. Equal to
 - c. Greater than

Information for questions 8-10: Suppose a classroom consists of 10 boys and 12 girls. Among the boys, 6 have dark hair. Among the girls, 9 have dark hair.

8. The proportion of boys in the classroom is:

a. $\frac{10}{12}$

b. $\frac{12}{10}$

c. $\frac{1}{3}$

d. $\frac{5}{11}$

9. Among all the students in the classroom, the proportion of girls with dark hair is:

a. $\frac{9}{12}$

b. $\frac{1}{3}$

c. $\frac{9}{22}$

d. $\frac{3}{11}$

10. Among the girls in the classroom, the proportion that do not have dark hair is:

a. $\frac{10}{22}$

b. $\frac{9}{12}$

c. $\frac{3}{22}$

d. $\frac{1}{4}$

Part B: Algebraic Notation

11. The expression $x \leq 4$ means:
- X is greater than 4
 - X is at least 4
 - X is less than 4
 - X is no more than 4
 - X is equal to 4
12. The expression $0 < x < 1$ means:
- X can be any number
 - X must be greater than 1
 - X must be negative
 - X can be greater than 1, or negative
 - X a number between 0 and 1
 - Nothing – the expression has no meaning
13. Suppose there is an interval on the x-axis. If the expression 0.40 ± 0.07 represents the interval's endpoints, then the interval is:
- The interval whose left-hand endpoint is at negative 0.47 and whose right-hand endpoint is at positive 0.47.
 - The interval whose left-hand endpoint is at positive 0.33 and whose right-hand endpoint is at positive 0.47.
 - The interval whose left-hand endpoint is at negative 0.33 and whose right-hand endpoint is at positive 0.33.

Part C: Algebraic Equations – Solving and Key Ideas

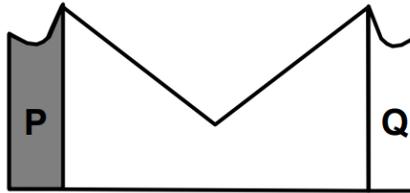
14. Suppose the number of people, y , on a bus, as a function of time, x (in minutes), is given by the equation $y = 4 + 2x$. The number of people on the bus after 20 minutes would be obtained by:
- Substituting 20 for y and solving for x .
 - Substituting 20 for x and simplifying.
 - No substitution is needed; the answer would be 20.
15. The answer to the previous question (how many people are on the bus after 20 minutes) is:
- 20 people
 - 120 people
 - 44 people
 - 8 people

16. Suppose the number of people, y , on a bus, as a function of time, x (in minutes), is given by the equation $y = 4 + 2x$. The time when there are 20 people on the bus would be obtained by:
- Substituting 20 for y and solving for x .
 - Substituting 20 for x and simplifying.
 - No substitution is needed; the answer would be 20.
17. The answer to the previous question (what is the time when there are 20 people on the bus) is:
- 20 minutes
 - 120 minutes
 - 44 minutes
 - 8 minutes

Part E: Linear Equations and Slope

18. Suppose the following shape is perfectly symmetric, left-to-right, and suppose the total area of the entire shape is 100 units^2 . If the thin, left-side shaded portion labeled “P” in the following picture is 5 units^2 , which of the following gives the area of just the thin right side portion labeled “Q”?

- $Q = 100 + 5$
- $Q = 100 - 5$
- $Q = 50 - 5$
- $Q = 2(100 - 5)$
- $Q = 200 - 5$
- $Q = 5$



19. In the standard 2-dimensional coordinate system, which of the following is typically true?
- The horizontal axis is “ x ”, and the vertical axis is “ y ”.
 - The vertical axis is “ x ”, and the horizontal axis is “ y ”.
 - Both axes (horizontal and vertical) are “ x ”.
 - Both axes (horizontal and vertical) are “ y ”.
20. In the standard 2-dimensional coordinate system, which of the following is generally true?
- The horizontal variable is the “output”, and the vertical variable is the “input”.
 - The vertical variable is the “output”, and the horizontal variable is the “input”.
 - Both variables (horizontal and vertical) are “output”.
21. In the standard 2-dimensional coordinate system, the point $(2, 5)$ would represent:
- A single point 2 units to the right and 5 units above the origin.
 - A single point 5 units to the right and 2 points above the origin.
 - Two points, one 2 units to the right of the origin and the other 5 units above the origin.
 - Two points, one 5 units to the right of the origin and the other 2 units above the origin.

Part F: Linear Equations and y-intercept

22.

A straight line whose graph *rises* from left to right:

- (A) Must have a negative slope.
- (B) Must have a positive slope.
- (C) Must have a slope of zero.

23.

A straight line whose graph *falls* from left to right:

- (A) Must have a negative slope.
- (B) Must have a positive slope.
- (C) Must have a slope of zero.

24.

There are two lines, the first having slope of 20, and the second having slope of 0.02. Then:

- (A) The graph of the first line *rises* from left to right, but the graph of the second line *falls*.
- (B) The graph of both lines rise from left to right, but the first line is steeper than the second.
- (C) The graph of both lines rise from left to right, but the second line is steeper than the first.

25.

Suppose I record the number of people in a bus over several minutes, so that the output, y , "number of people" is a linear function of the input, x , "time" (in minutes); and suppose the slope of the line is positive. Then:

- (A) As each minute goes by, the number of people decreases.
- (B) As each minute goes by, the number of people increases.
- (C) As each minute goes by, the number of people does not change.

26.

Suppose I place books on a scale, so that the output, y , "weight" (in pounds) is a linear function of the input, x , "number of books"; and suppose the slope of the line is 0.1. Then:

- (A) As each one book is added, the weight *increases* by ten pounds.
- (B) As each one book is added, the weight *increases* by only a tenth of a pound.
- (C) As each one book is added, the weight *increases* by one pound.
- (D) As more books are added, the weight *decreases*.

27.

Suppose I place books on a scale, so that the output, y , "weight" (in pounds) is a linear function of the input, x , "number of books"; and suppose the slope of the line is 10. Then:

- (A) As each one book is added, the weight *increases* by ten pounds.
- (B) For every ten books that are added, the weight *increases* by only one pound.
- (C) For every ten books that are added, the weight *increases* by ten pounds.
- (D) As more books are added, the weight *decreases*.

28.

Suppose I record the number of people in a bus over several minutes, so that the output, y , "number of people" is a linear function of the input, x , "time" (in minutes); and suppose the slope of the line is zero. Then:

- (A) As each minute goes by, the number of people on the bus *increases*.
- (B) As each minute goes by, the number of people on the bus *decreases*.
- (C) As each minute goes by, the number of people on the bus remains constant.
- (D) As each minute goes by, the number of people on the bus goes to zero.

29.

A straight line with y -intercept of 5:

- (A) Passes through the point where $x=0$ and $y=0$.
- (B) Passes through the point where $x=5$ and $y=0$.
- (C) Passes through the point where $x=0$ and $y=5$.
- (D) Passes through the point where $x=5$ and $y=5$.
- (E) Passes through the point where $x=-5$ and $y=5$.

30.

A straight line with y -intercept of 4:

- (A) Must cross the horizontal axis 4 units to the left of the origin.
- (B) Must cross the horizontal axis 4 units to the right of the origin.
- (C) Must cross the vertical axis 4 units above the origin.
- (D) Must cross the vertical axis 4 units below the origin.
- (E) Must pass through the origin.

31.

Suppose I record the number of people in a bus over several minutes, so that the output, y , "number of people" is a linear function of the input, x , "time" (in minutes). If the y -intercept is 5, this means:

- (A) When I began, my watch read "5 minutes".
- (B) When I began, there were 5 people on the bus.
- (C) As each minute goes by, the number of people increases by 5.
- (D) As each minute goes by, the number of people decreases by 5.

32.

Suppose I place books on a scale, so that the output, y , "weight" (in pounds) is a linear function of the input, x , "number of books". If the y -intercept is 3, this means:

- (A) As each book is added, the weight increases by 3 pounds.
- (B) As each book is added, the weight decreases by 3 pounds.
- (C) With no books, the scale reads "3 pounds".
- (D) With 3 books, the scale reads "0 pounds".

Information for questions 33-37: Respond to the following problems on a separate piece of paper. Submit your responses on the first day of school.

33. Solve for the variable b in the following equation. Show all work.

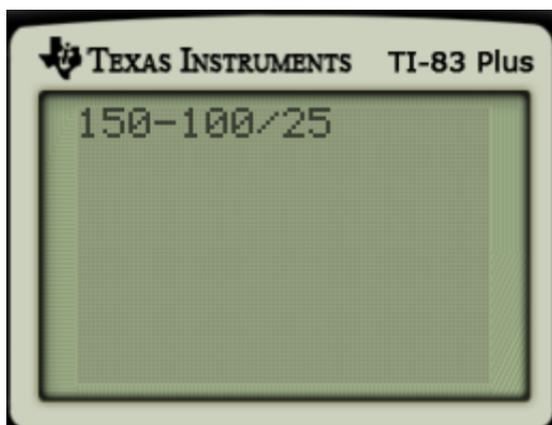
$$a = \frac{b-c}{d}$$

34. Solve for the variable d in the following equation. Show all work.

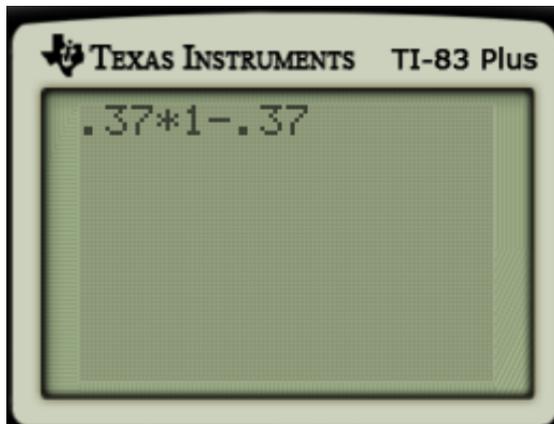
$$a = b \cdot \frac{c}{\sqrt{d}}$$

Part D: Order of Operations on a Calculator

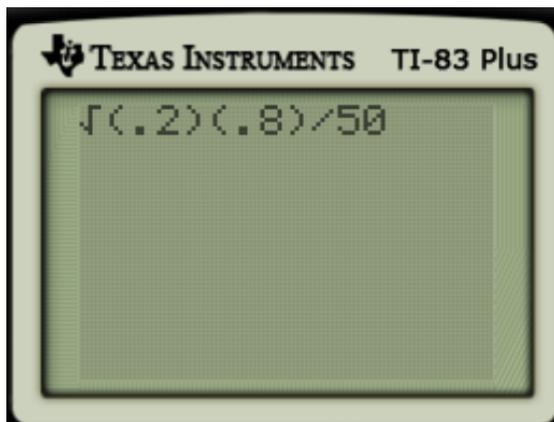
35. Suppose I want to use a calculator to evaluate the expression $\frac{150-100}{25}$. If I use the same input displayed below, will I get the correct answer? Why or why not? If not, how should I have entered the expression?
Note that the correct answer is 2.



36. Suppose I want to use a calculator to evaluate the expression $(0.37)(1 - 0.37)$. If I use the same input displayed below, will I get the correct answer? Why or why not? If not, how should I have entered the expression? *Note that the correct answer is 0.2331.*



37. Suppose I want to use a calculator to evaluate the expression $\sqrt{\frac{(0.2)(0.8)}{50}}$. If I use the same input displayed below, will I get the correct answer? Why or why not? If not, how should I have entered the expression? *Note that the correct answer is approximately 0.0566.*



Congratulations! You have now completed the AP/ECE Statistics Summer Packet! ©